

May 1895.

*Jupiter's Satellites.*

395

| Day of<br>Obs. | Satellite. | Phenomenon. | Phase.           | G.M.T. of<br>Observation.          | N. <i>Almanac</i><br>Time. |
|----------------|------------|-------------|------------------|------------------------------------|----------------------------|
| 1895.          |            |             |                  | h m s                              | h m s                      |
| April 10       | (10) IV.   | Oc. D.      | External contact | 7 52 0                             | 7 55 0                     |
|                |            |             | Bisection        | 7 56 to 8 <sup>h</sup>             |                            |
|                |            |             | Just gone        | 8 5 0                              |                            |
|                | III.       | Ec. D.      | Fading           | 9 3 0                              | 9 6 51                     |
|                |            |             | Bisection        | 9 6 0                              |                            |
|                |            |             | Just gone        | 9 8 8                              |                            |
|                | (11) IV.   | Oc. R.      | Bisection        | 9 45 0                             | 9 48 0                     |
|                |            |             | External contact | 9 48 0                             |                            |
| 14             | (12) I.    | Oc. D.      | External contact | 8 36 30                            | 8 37 0                     |
|                |            |             | Bisection        | 8 38 0                             |                            |
|                |            |             | Just gone        | 8 39 50                            |                            |
| 15             | (13) I.    | Tr. E.      | External contact | 8 5 <sup>m</sup> to 6 <sup>m</sup> | 8 6 0                      |
|                | II.        | Tr. I.      | External contact | 8 21 0                             | 8 25 0                     |
|                |            |             | Internal contact | 8 24 0                             |                            |
| May 8          | I.         | Tr. E.      | Internal contact | 8 28 30                            | 8 34 0                     |
|                |            |             | External contact | 8 33 0                             |                            |

*Notes.*

(a) Violent motion. (b) Much boiling; shadow not seen till nearly quite on disc. (c) Poor definition; high wind; some cloud. (d) Planet low. Bad definition. (e) Bad definition. (f) Planet low. Poor definition. (g) Planet low; much motion. (h) A difficult observation, the satellite being not far from the South pole of *Jupiter*. The satellite became invisible before 7<sup>h</sup> 40<sup>m</sup>. (i) Satellite entered shadow very close to planet. (j) Fair definition to-night. (k) Often clouded; much motion. (l) Much cloud passing. Satellite invisible at 8<sup>h</sup> 20<sup>m</sup>. (m) Violent motion. (n) Much motion. (o) Much cloud. (p) Definition bad. (q) Wind; showers of snow. (r) Bad definition. (s) Much cloud; hazy. (t) Definition not good; misty. (u) Good definition. A difficult observation owing to shadow being near South pole of *Jupiter*. (v) Definition bad. (w) Good definition. Satellite I., in transit, became invisible at about 8<sup>h</sup>; not seen again till 9<sup>h</sup> 15<sup>m</sup>. (x) Much motion. (y) Very misty. (z) Good definition. Very misty. (1) Cloudy. (2) Definition not good. (3) Poor definition. (4) Very bad definition. (5) In early twilight. (6) Bad definition. (7) Much motion. (8) Planet low in W. Poor definition. (9) Bad sky. (10) Much boiling. (11) Bad definition. (12) Bad definition. (13) Violent motion.

*Some Transits of Dark Spots on the Dark Belt below (N)  
Jupiter's Equator.*

1. A dark spot which passed about 3 $\frac{1}{2}$ <sup>h</sup> before the zero meridian.

Observations.—1894 Nov. 15: 3<sup>h</sup> 21<sup>m</sup> before the zero meridian. Nov. 17: 3<sup>h</sup> 22<sup>m</sup>. Dec. 18: 3<sup>h</sup> 26<sup>m</sup>. 1895 Jan. 2: 3<sup>h</sup> 29<sup>m</sup>; much motion. Jan. 26: 3<sup>h</sup> 30<sup>m</sup>; good. Jan. 21: 3<sup>h</sup> 34<sup>m</sup>; very

I I 2

bad definition. Feb. 7 :  $3^h 32^m$ ; poor definition. Feb. 12 :  $3^h 35^m$ ; good definition.

2. A dark spot which passed about  $2^h 36^m$  before the zero meridian.

Observations.—1895 Feb. 12 :  $2^h 35^m$ ; good. Feb. 26 :  $2^h 38^m$ ; poor.

3. A dark spot which passed about  $1^h 8^m$  after the zero meridian.

Observations.—1895 Feb. 8 :  $1^h 14^m$ ; fair. Feb. 11 :  $1^h 15^m$ ; good. Feb. 13 :  $1^h 10^m$ ; fair. Feb. 20 :  $1^h 9^m$ ; good. March 11 :  $1^h 7^m$ ; bad sky. March 16 :  $1^h 6^m$ ; bad sky.

4. A dark spot which passed about  $1^h 46^m$  after the zero meridian.

Observations.—1894 Dec. 22 :  $1^h 52^m$ ; fair definition. Dec. 27 :  $1^h 45^m$ ; fair. 1895 Jan. 8 :  $1^h 47^m$ ; much motion.

5. A dark spot which passed about  $2^h 36^m$  after the zero meridian.

Observations.—1895 : Feb. 11 :  $2^h 35^m$  good. Feb. 13 :  $2^h 33^m$ ; fair. Feb. 16 :  $2^h 34^m$ ; poor. Feb. 21 :  $2^h 38^m$  fair.

6. A dark spot which passed about  $3^h 47^m$  after the zero meridian.

Observations.—1895 Jan. 23 :  $3^h 51^m$ ; fair. Jan. 25 :  $3^h 52^m$ ; bad. Feb. 4 :  $3^h 49^m$ ; fair. Feb. 16 :  $3^h 41^m$ ; bad. Feb. 21 :  $3^h 47^m$ ; fair. March 7 :  $3^h 41^m$ ; fair.

*Some Transits of Bright Spots on the same Dark Belt.*

1. 1895 Feb. 12 :  $1^h 39^m$  before the zero meridian.

2. 1895 Jan. 26 :  $1^h 27^m$  before the zero meridian.

3. 1895 Jan. 24 :  $2^h 12^m$  before the zero meridian. Jan. 26 :  $2^h 9^m$ . Feb. 12 :  $2^h 11^m$ .

4. 1895 Feb. 7 :  $4^h 15^m$  before the zero meridian.

5. 1894 Dec. 22 :  $1^h 7^m$  after it. Dec. 27 :  $1^h 0^m$ .

6. 1895 Jan. 23 :  $3^h 36^m$  after it. Jan. 30 :  $3^h 32^m$ . Feb. 4 :  $3^h 32^m$ . Feb. 11 :  $3^h 28^m$ . Feb. 16 :  $3^h 29^m$ . Feb. 21 :  $3^h 32^m$ .

*Dark Spots on the Dark Belt above (S) the Equator.*

1895 Feb. 21 :  $2^h 39^m$  after the zero meridian. And April 10 :  $4^h 48^m$  before it.

*Transits of the Highest Point of the Slanting Belt close behind the following end of the Red Spot.*

1895 Feb. 13 :  $0^h 36^m$  after the zero meridian. Feb. 20 :  $0^h 34^m$ . March 11 :  $0^h 40^m$ . April 9 :  $0^h 37^m$ .

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397

*Transits of Mouths of Bright Sinuous Canals in South Equatorial Band (dark).*

1895 Feb. 8:  $3^h 7^m$  after the zero meridian. Feb. 21:  $2^h 25^m$  after the zero meridian.

The zero meridian used is Marth's II.

The bright spots were on the lower (N) edge of the dark belt.

*Transits of the Red Spot.*

| Transit of Red Spot. |       | Transit of Zero Meridian. |   | Interval. |                  |
|----------------------|-------|---------------------------|---|-----------|------------------|
|                      | h m   | h m                       | m |           |                  |
| 1894.<br>Dec. 12     | 9 52  | 9 45                      | 7 |           | Hazy sky.        |
| 19                   | 10 37 | 10 29                     | 8 |           | Spot very faint. |
| 1895.<br>Jan. 25     | 6 2   | 5 59                      | 3 |           | " " "            |
| Feb. 7               | 11 47 | 11 41                     | 6 |           | Misty.           |
| 8                    | 7 39  | 7 33                      | 6 |           | Spot faint.      |
| 12                   | 10 53 | 10 50                     | 3 |           | Bad definition.  |
| 20                   | 7 32  | 7 28                      | 4 |           | Good definition. |
| Mar. 11              | 8 17  | 8 13                      | 4 |           | Bad sky.         |
| 16                   | 7 28  | 7 23                      | 5 |           | " "              |
| Apr. 9               | 7 25  | 7 19                      | 6 |           | Much motion.     |

*Dark Transit of Satellite III.*

1895 Feb. 8: Satellite III. passed on to the disc at about  $7^h 3^m$ . It was invisible at  $7^h 30^m$ . At  $8^h$  and until about half an hour before egress ( $9^h 51^m$ ) it was seen as a dark (not black) circular spot.

In all the preceding observations Greenwich Mean Time was used; and the instrument used was the  $9\frac{1}{3}$ -inch Cooke Equatorial Refractor: powers 240, 330, and 470.

*Note on the Red Spot.*—Between 1894 November and 1895 March this object was carefully examined whenever visible. It was never seen with ease and distinctness—was always somewhat difficult. No colour was seen in it; in fact, it was simply an elliptical outline. The best views of it were usually obtained before and after it had passed the central meridian.

The transits were made by placing one web of the micrometer on one limb of *Jupiter*, the other web bisecting the disc.

*Photograph of the Nebula near 15 Monocerotis.*

By Isaac Roberts, D.Sc., F.R.S.

The photograph of the nebula near 15 *Monocerotis*, R.A. 6<sup>h</sup> 35<sup>m</sup>, Decl. 10° 0' north, was taken with the 20-inch reflector on 1895 February 13, with exposure of the plate during three hours, and the copy now presented is enlarged to the scale of 1 millimètre to 24 seconds of arc.

References to the star and to the region around it will be found in the *New General Catalogue*, No. 2264; *The General Catalogue*, No. 1440; Sir J. Herschel's *Catalogue of Nebulae and Clusters of Stars*, No. 401; Lord Rosse's *Observations of Nebulae and Clusters of Stars*, p. 53; and Professor Barnard in *Astronomy and Astro-Physics*, vol. xiii. pp. 178, 182.

Sir J. Herschel and Lord Rosse suspected 15 *Monocerotis* to be a nebulous star, or else involved in nebulosity, but they could not detect any nebulosity in the region surrounding the star. Professor Barnard took three photographs of this region in 1894 January and February, and upon them found "nebulosity covering a diameter of about three degrees," and he states that "at 12 minutes of arc south preceding 15 *Monocerotis* the nebulosity becomes a compact mass with numerous wisps and holes in it, and the whole group of three or four bright stars is involved in this denser wispy light, but 15 *Monocerotis* itself does not seem to be specially connected with the nebulosity further than to be apparently in it—that is, there are no indications of condensation about the brightest star of the group."

The photograph now presented, and the lantern slide which is projected on the screen, show a multiple star at position angle 219° and distance 8' 8" from 15 *Monocerotis*, and this is about the centre of the large condensation of the nebulosity. At position angle 173° and distance 29' 52" from 15 *Monocerotis* is the apex of a conical dark space bounded by a rim of nebulosity, and at the apex also are three stars, one about 14th, another about 15th, and the other about 17th magnitude. The space between these and the multiple star is faintly nebulous, and there is also a faint detached curve of nebulosity at position angle 8° and distance 19' from 15 *Monocerotis*.

Professor Barnard has sent to the Society a positive copy on glass of his photograph of the region surrounding 15 *Monocerotis*, and a lantern slide has been made from it to the scale of the photograph which I have just exhibited. It is now projected on the screen, and you will at once recognise the vast difference between a photograph taken with a small camera and one taken of the same region with a comparatively large reflector. The reflector photograph shows clearly the fine details of the nebulosity and their relationship with the involved and surrounding stars, and also that the stars are far more numerous on